UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,894	10/26/2001	John Erik Lindholm	NVIDP011A/P000094	7963

23419 7590 07/29/2003

COOLEY GODWARD, LLP
3000 EL CAMINO REAL
5 PALO ALTO SQUARE
PALO ALTO, CA 94306

EXAMINER	
HAVAN, THU THAO	
ART UNIT	**PAPER NUMBER**
2672	11

DATE MAILED: 07/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/032,894	Applicant(s) LINDHOLM ET AL.	
	Examiner Thu-Thao Havan	Art Unit 2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 24-41 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims **24-41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Peercy et al. (US patent no. 6,163,319) in view of Parikh et al. (US Patent No. 6,175,367).

Re claim **24**, Peercy teaches a lighting system for graphics processing comprising at least one input buffer adapted for being coupled to a transform system for receiving vertex data thereform (col. 12, line 33 to col. 13, line 31; fig. 2a), a multiplication logic unit coupled to the at least one input buffer (col. 17, line

35 to col. 19, line 24; fig. 7a), an arithmetic logic unit coupled to the at least one input buffer and the multiplication logic unit (col. 21, line 30 to col. 24, line 35; fig. 9), and a lighting logic unit coupled to the arithmetic logic unit, the at least one input buffer, and the multiplication logic unit (col. 21, line 30 to col. 25, line 43; fig. 9-10). In other words, Peercy teaches shading vectors including a lighting vector and a viewing vector are transformed by matrix into corresponding tangent space vectors. These transformation calculations are performed according to the multiplication and arithmetic unit. Furthermore, this transformation is preferably carried out at each triangle vertex point. The transformed lighting and viewing vectors are then interpolated on a per-pixel basis across each triangle and normalized.

Peercy fails to specifically disclose a register unit as claimed. However, Parikh teaches a register unit (col. 6, line 23 to col. 8, line 52; fig. 1). The data storage device of Parikh corresponds to the register unit as claimed. Parikh determines a color for the pixel by incorporating the diffuse term and the specualar term according to a Phong lighting equation. His system computes the difference terms between vectors N and H for each of the vertices in a computer readable memory unit. The computer readable memory unit coupled with bus for storing static information and instructions for the host processor. The information is register in the data storage device. Thus, it would have been obvious for one of ordinary skill in the art to combine a register unit of Parikh to the system of Peercy because it would have enabled storage of information by registering the

information in a computer readable unit (Parikh: col. 6, line 23 to col. 8, line 52; fig. 1).

Re claims **25-26 and 37-38**, Peercy teaches multiplication logic unit has a feedback loop coupled to an input thereof and lighting logic unit is coupled to the multiplication logic unit via a conversion module adapted for converting scalar vertex data to vector vertex data (col. 24, line 36 to col. 25, line 43). Peercy teaches a logical unit for light and color module. The module transforms shaping vectors from eye space into object space. Object space matrix module builds an object space transform matrix. Transform module multiplies each shading vector by the matrix. The eye space lighting and viewing vectors are transformed by matrix to corresponding object space vectors.

Re claim **27**, Peercy teaches arithmetic logic unit and the multiplication logic unit include multiplexers (col. 16, line 53 to col. 17, line 25). In other words, Peercy teaches multiplexers to support tangent space bump mapping in a conventional graphics hardware system having a texture memory and Phong shading rasterization hardware.

Re claims **28-29**, Peercy teaches multiplication logic unit includes three multipliers coupled in parallel and arithmetic logic unit includes three adders coupled in series and parallel (col. 9, line 65 to col. 10, line 10). Peercy teaches the tangent space transform matrix M (p) transforms the tangent spaces of points on an object surface so that all corresponding tangent vectors are parallel, all binormal vectors are parallel, and all normal vectors are parallel. The object surface is typically defined with reference to a surface parametric function p (u, v)

in a three-dimensional object space (x, y, z). Matrix M (p) then represents a tangent space transform that (1) maps the natural embedding of the tangent space of an object surface at point P to the x, y plane in object space and (2) maps the normal n to the z axis.

Re claims **31 and 39**, Parikh teaches memory includes a plurality of constants for processing the vertex data (figs. 2 and 7). Based on these derivations, Parikh teaches computes the specular term, (N.cndot.H).sup.s, for each of the pixels of a triangle in a polygon mesh comprising an image. FIG. 7 illustrates a flow diagram of the steps involved in computing the specular term, (N.cndot.H).sup.s, for each of the pixels of an exemplary triangle. The steps detailed in the flowchart are implemented as program instructions stored in computer readable memory units of computer system (FIG. 2) and is executed over processor. Parikh teaches an exemplary triangle from a polygon mesh comprising an image. The triangle is defined by three vertices with associated coordinates (x, y, z). Each vertex has normalized N and H vectors. Then he teaches the step of computing a difference term, vertline.N-H.vertline., for each vertex of the selected triangle.

Re claims **32-33**, Parikh teaches memory had a read terminal coupled to the multiplication logic unit and a write terminal coupled to the arithmetic logic unit (col. 6, lines 23-65; fig. 2). Parikh teaches computer graphics system comprises an address/data bus for communicating information, one or more host processors coupled with bus for processing information and instructions, a computer readable volatile memory unit (e.g., random access memory unit)

coupled with bus for storing information and instructions (e.g., graphics data) for the host processor, a computer readable non-volatile memory unit (e.g., read only memory unit) coupled with bus for storing static information and instructions for the host processor, a computer readable data storage device such as a magnetic or optical disk and disk drive (e.g., hard drive or floppy diskette) coupled with bus for storing information and instructions, and a display device coupled to bus for displaying information (e.g., 3D images) to the computer user.

Re claims **30, 34-36, and 40-41**, the limitations of claims 30, 34-36, and 40-41 are identical to claim 24 above. Therefore, claims 30, 34-36, and 40-41 are treated the same as discussed with respect to claim 24 above.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Keondjian, US Patent No. 5,812,136

Kommrusch et al., US Patent No. 5,444,838

Van Hook et al., US Patent No. 6,166,748

Inquiries

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thu-Thao Havan whose telephone number is (703) 308-7062. The examiner can normally be reached on Monday to Thursday from 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (703) 305-4713.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Thu-Thao Havan
Art Unit: 2672
July 26, 2003

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600